

SELECTED PROCESSING FOR NON-EQUILIBRIUM LIGHT ALLOYS AND PRODUCTS

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Cited documents:

 GB2262539 (A)
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 EP0414620 (A1)
 GB2174509 (A)

Abstract of WO 9604409 (A1)

Methods to produce corrosion resistant wrought light alloys and products, in particular aluminium and magnesium alloys, the latter containing 0.1-0.2 to 30-35 wt.% light rare earth metals and/or corresponding misch-metals and/or Y (and Eu) and/or 0.1 to 40 wt.% early transition metals and/or metalloids, by appropriate extension of corresponding latitude of alloying made possible by very extreme processing conditions of rapid solidification techniques via vapour deposition using thermal evaporation and/or plasma and magnetron sputtering methods. Engineering solutions are described to control productivity, quality and yield, via melt spinning, planar flow casting, laser beam surface melting and ball milling techniques including five particular methods for mechanical alloying, mechanical grinding and/or reaction milling, all employed to achieve the unique microstructures required for superior property profiles. These are followed by consolidation procedures including extrusion, rolling, forging, drawing and superplastic forming. The alloys show surprising resistance to corrosive attack even under the exposure to saline environments containing hydrogenperoxide (H2O2). The alloys may contain (depending on the alloy synthesis method employed) further minor and major additions of transition and simple metals as well as metalloids with similar characteristics as rare earth and early transition metals regarding passivation of the alloyed surface.

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